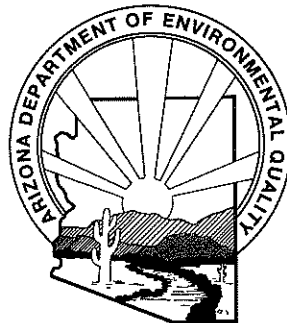


ARIZONA
DEPARTMENT OF
ENVIRONMENTAL
QUALITY

1995 Air Quality Data for Arizona



1995

AIR QUALITY DATA

FOR ARIZONA

Annual Report

Honorable Fife Symington
Governor
State of Arizona

Arizona Department of Environmental Quality
Russell F. Rhoades, Director

ACKNOWLEDGMENTS

The Arizona Department of Environmental Quality extends sincere appreciation to the sampler operators named below for their services, which included operating particulate samplers and mailing the samples collected at the State's monitoring sites.

Ajo	Charles Conner
Clarkdale	Sonny Jackson
Douglas (15th Street)	John Cryar
Flagstaff	Mark Forest
Hayden	Ray Morales
Hillside	ADEQ HAPS Team
Mesa	Tim Thaut
Montezuma Castle National Monument	U. S. National Park Service Staff
Naco	Steve Rich
Nelson	Perry Curly
Nogales	Ricardo Maldonado & Ben Stapleton
Organ Pipe Cactus National Monument	U.S. National Park Service Staff
Paul Spur	John Cryar
Payson	Alice Turner
Prescott	Armando Valadez
Rillito	Carl Gremmler
Safford	Jim Moser
Sedona	Ken Griffith
Show Low	Bettilou Hopper
Yuma	Ahmed N'aitAli

ACKNOWLEDGMENTS

The Arizona Department of Environmental Quality expresses its appreciation for the assistance of the following companies and agencies and their staff who provided air quality data for this report:

Applied Environmental Consultants for Louis Thanukos
Arizona Portland Cement Company

Arizona Public Service Company David R. Simenton

ASARCO, Incorporated Neil A. Gambell

BHP Copper, Inc (Magma). Jerry C. May

Cyprus Miami Mining Corporation Wayne Leipold

Maricopa County Environmental Services Department Violettee Brown

National Park Service Jim Sisler & David Joseph

Phoenix Cement Company Floyd Fusselman

Pima County Department of Environmental Quality David Esposito

Pinal County Air Quality Control District Donald Gabrielson

Praxair, Inc. Thomas C. Ahlers

Salt River Project P. W. "Bill" Aihs & Jack A. Rassi, P.E.

Southern California Edison Company Stan Marsh

Tucson Electric Power Company Cosimo DeMasi

TABLE OF CONTENTS

Acknowledgement	i-ii
Table of Contents	iii
Tables	iv
Figures	v
 I. AIR QUALITY STANDARDS	 1-2
 II. AIR QUALITY MONITORING NETWORKS	 3
A. Monitoring Networks	3
B. Data Reporting/Quality Assurance	4-5
C. Special Monitoring Studies	4-5
 III. AIR QUALITY DATA FOR 1995	 12
 IV. AIR QUALITY TRENDS	 33
A. Carbon Monoxide	33
B. Lead	33
C. Nitrogen Dioxide	33
D. Ozone	33-34
E. PM ₁₀	34
F. Sulfur Dioxide	34

TABLES

Table 1	Ambient Air Quality Standards	14
Table 2	1995 Counties and Towns Monitored	15
Table 3	1995 Carbon Monoxide Data (in ppm)	19
Table 4	1995 Lead Data (in $\mu\text{g}/\text{m}^3$) In TSP or PM_{10}	21
Table 5	1995 Nitrogen Dioxide Data (in $\mu\text{g}/\text{m}^3$)	23
Table 6	1995 Ozone Data (in ppm)	24
Table 7	1995 PM_{10} Data (in $\mu\text{g}/\text{m}^3$)	26
Table 8	1995 Sulfur Dioxide Data (in $\mu\text{g}/\text{m}^3$)	31
Table 9	PM_{10} Concentrations In Phoenix Urban Area	41
Table 10	PM_{10} Concentrations In Tucson Urban Area	41
Table 11	PM_{10} Concentrations In Various Cities	42

FIGURES

Figure 1	Maricopa County Monitoring Network	6
Figure 2	Pima County Monitoring Network	8
Figure 3	State and Industrial Monitoring Networks	10
Figure 4	Carbon Monoxide Concentrations in Phoenix and Tucson	35
Figure 5	Carbon Monoxide Exceedances in Phoenix and Tucson	36
Figure 6	Lead Concentrations in Phoenix and Tucson	37
Figure 7	Ozone Concentrations in Phoenix, Tucson and Yuma	38
Figure 8	Ozone Exceedances in Phoenix	39
Figure 9	Sulfur Dioxide Exceedances in Hayden, Miami and San Manuel	40

I. AIR QUALITY STANDARDS

(National Ambient Air Quality Standards)

EPA has set NAAQS for six pollutants, which are summarized in Table 1. For each pollutant EPA has adopted primary standards to protect public health and secondary standards to protect public welfare. The states are required to adopt standards which are at least as stringent as the NAAQS. In Arizona, ambient air quality standards are identical to the federal NAAQS. These six pollutants are referred to as criteria pollutants because criteria documents are prepared which summarize effects on public health and welfare.

A brief summary of the health and welfare effects which have been considered prior to setting ambient air quality standards is given below. It should be noted that PM_{10} is defined as particles 10 microns or smaller in diameter.

Pollutant

Carbon Monoxide	Impairs the ability of blood to carry oxygen in the body. Cardiovascular system is primarily affected, causing angina pain in persons suffering from cardiac disease and leg pain in persons suffering from cardiac arterial disease. Affects other mammals in a similar manner.
Lead	Damages the cardiovascular, renal, and nervous systems resulting in anemia, brain damage, and kidney disease. Preschool age children are particularly susceptible to brain damage effects. Similar effects observed in other mammals. Others adverse effects on animals, microorganisms, and plants.
Nitrogen Dioxide	Impairs the respiratory system, causing a high incidence of acute respiratory diseases. Preschool children are especially at risk. Damages certain plants and materials. Degrades visibility due to its brownish color and its conversion to nitrate particles. Nitrate particles are also a major component of acid deposition.
Ozone	Damages the respiratory system, reducing breathing capacity and causing chest pain, headache, nasal congestion and sore throat. Individuals with chronic respiratory diseases are especially susceptible to ozone. Injures certain plants, trees, and materials.
PM_{10}	Causes irritation and damage to the respiratory systems, resulting in difficult breathing, inducement of bronchitis, and aggravation of existing respiratory diseases. Also, certain polycyclic aromatic hydrocarbons in PM_{10} are carcinogenic. Individuals with respiratory and cardiovascular diseases, children, and

elderly persons are at greatest risk. Secondary effects include soiling, damaging materials and impairment of visibility. PM_{10} also is associated with acid deposition which damages materials, plants, and trees and acidifies surface waters, thereby harming aquatic life.

Sulfur Dioxide

Aggravates asthma, resulting in wheezing, shortness of breath, and coughing. Healthy persons exhibit the same responses at higher exposures. Asthmatics and atopic individuals are the most sensitive groups, followed by those suffering from bronchitis, persons with emphysema, bronchiectasis, cardiovascular disease, the elderly, and children. Damages certain plants and materials. Impairs visibility and contributes to acid deposition due to the its conversion to sulfate particles.

The Clean Air Act requires EPA to periodically review the NAAQS and adopt revisions when new information indicates that changes are appropriate. As a result, EPA is considering revisions to the ozone and PM_{10} standards. The basis for possible changes is new research findings on health effects. For ozone EPA is looking at a change to an 8-hour standard. Recent information indicates that the chronic effects of ozone correlate better with 8-hour concentrations than with 1-hour concentrations. The level of an 8-hour standard would probably be set between 0.07 to 0.09 ppm. In addition to changing the averaging time and the level of the standard, EPA may change the number of exceedances allowed per year. Currently, one exceedance per year is allowed with the 1-hour standard of 0.12 ppm. With an 8-hour standard, the number of allowed exceedances could be as low as one and as high as five per year. This aspect of the standard will be decisive in determining which areas will be attainment or nonattainment. For example, in analyzing 1993-1995 data for Arizona, it was found that from one to four counties would have been nonattainment, depending on the number of allowed exceedances.

In regard to PM_{10} , EPA is considering revising the current 24-hour standard by using $PM_{2.5}$ (particles equal to or less than 2.5 microns in diameter) as the pollutant indicator. $PM_{2.5}$ appears to have a greater health effect than PM_{10} during short-term exposure. The level of the 24-hour $PM_{2.5}$ standard is likely to be between 25 and 85 $\mu g/m^3$. For the annual $PM_{2.5}$ standard, a level between 7.5 and 25 $\mu g/m^3$ will probably be proposed. In addition, EPA is expected to retain the annual PM_{10} standard to protect against health effects of coarse particles.

II. AIR QUALITY MONITORING NETWORKS

A. MONITORING NETWORKS

In Arizona, ambient air monitoring for criteria pollutants is conducted by a number of governmental agencies and regulated industries. Criteria pollutants are those pollutants for which federal air quality standards have been adopted. They include carbon monoxide, lead, nitrogen dioxide, ozone, particulates of PM₁₀, and sulfur dioxide. Federal and state air quality standards are listed in Table 1. A list of the monitoring network operators and the areas monitored is given below.

<u>Agency or Industry</u>	<u>Area Monitored</u>
Arizona Portland Cement Co.	Rillito
Arizona Public Service Co.	Joseph City
ASARCO, Inc.	Hayden
Cyprus Miami Mining Corp.	Miami
BHP Copper, Inc (Magma).. . . .	San Manuel
Maricopa County Environmental Services Dept.	Phoenix Urban Area
National Park Service	National Monuments and Parks
Pima County Dept. of Environmental Quality	Tucson Urban Area
Pinal County Air Quality Control District	Pinal County
Praxair, Inc.	Kingman
Salt River Project	Page and St. Johns
Southern California Edison Co.	Bullhead City, AZ and Laughlin, NV
Tucson Electric Power Co.	Tucson and Springerville

Maps indicating the locations of the Phoenix, Tucson and statewide monitoring stations are provided in Figures 1, 2, and 3. The Maricopa, Pima, and Pinal Counties networks are operated primarily to monitor urban-related air pollution. In contrast, the industrial networks are operated to

monitor emissions from certain industrial facilities. State monitors are employed for a variety of purposes, including urban, industrial, rural and background surveillance.

B. DATA REPORTING/QUALITY ASSURANCE

Ambient air quality data collected in 1995 by the various networks above are summarized in Section II. of this report. In addition, Maricopa and Pima Counties and some of the companies publish annual reports which include summaries of their data.

Raw data files are maintained by each of the network operators. In addition, the U.S. Environmental Protection Agency (EPA) stores raw data submitted quarterly by Maricopa and Pima Counties and the State. EPA analyzes these data for the purposes of evaluating progress in attaining and maintaining the NAAQS and reporting trends in air quality to the President and Congress.

Maricopa and Pima Counties report pollutant concentrations in the Phoenix and Tucson urban areas each day to the public via television, radio, newspapers and telephone. The data are reported in pollutant standard index (PSI) units, that is, units of concentrations relative to the standards. These reports include the descriptor words "good", "moderate", "unhealthy", "very unhealthy", or "hazardous", depending on pollutant levels.

The industrial operators submit either monthly or quarterly data reports to the state, depending on the type of facility. In addition, they are required to report any exceedance of an air quality standard by the next working day. The report includes an explanation of the causes of the exceedance and corrective actions to be taken, if possible, to prevent future occurrences.

To ensure that valid data are obtained, each network operator conducts a quality assurance program in accordance with state and federal requirements.

C. SPECIAL MONITORING STUDIES

In addition to monitoring criteria pollutants at fixed sites, the State conducts special monitoring studies. These studies address several issues including:

- * Visibility in urban areas.
- * Visibility in Class I (pristine) areas.
- * HAPS (Hazardous Air Pollutants).
- * Border area air quality.

Visibility is monitored in the urban areas of Phoenix and Tucson to assess spatial and temporal variations

and to evaluate sources of visibility reduction. This study is a follow-up to the research performed by DRI (Desert Research Institute) in Phoenix in 1989-1990 and by ENSR Consulting and Engineering in Tucson in 1992-1993, the so-called brown cloud studies. In these studies DRI and ENSR performed special monitoring to determine which pollutants have the greatest impact on visibility. They also determined the major sources of these pollutants. However, since this research was performed in the fall and winter seasons, it is necessary to conduct year round monitoring to assess seasonal changes in visibility.

Visibility is also monitored in the federally designated Class I areas, that is pristine areas where visibility protection is required by the Clean Air Act. In Arizona there are twelve national parks and wilderness areas which have been designated as Class I areas. Visibility monitoring in these areas has been conducted by the National Park Service and the National Forest Service. However, the State is now developing a plan to expand visibility monitoring activities in Arizona. This monitoring plan is being developed in cooperation with federal agencies and the Indian Tribes. In accordance with the plan, additional monitoring equipment should be in operation in 1996.

HAPS monitoring was initiated in 1993 by the State in conjunction with a study of the impacts of HAPS in Arizona. In addition to monitoring, the study involved an inventory of sources and emissions and an assessment of health risks due to HAPS. A report on the study was submitted to the legislature in 1995, and is currently being peer reviewed.

On the Arizona-Mexico border special monitoring studies are conducted to evaluate the air quality impacts of urban and industrial activities. Preliminary studies conducted in 1990 found that a majority of PM_{10} pollution measured on the U.S. side of the border originated in Mexico and was transported by winds which on nearly a daily basis causes air pollution exchange between the two countries. Starting in 1994, a second study in the Nogales area was done. In this study monitoring for PM_{10} and HAPS was performed in both Nogales, Mexico and Nogales, Arizona. An inventory of PM_{10} and HAPS emissions on both sides of the border is in progress, and the results will be used to apportion source impacts, human health risk assessment and evaluation of potential controls. In 1997, a similar PM_{10} /HAPS monitoring and inventory investigation will be done in Douglas and Aqua Prieta.

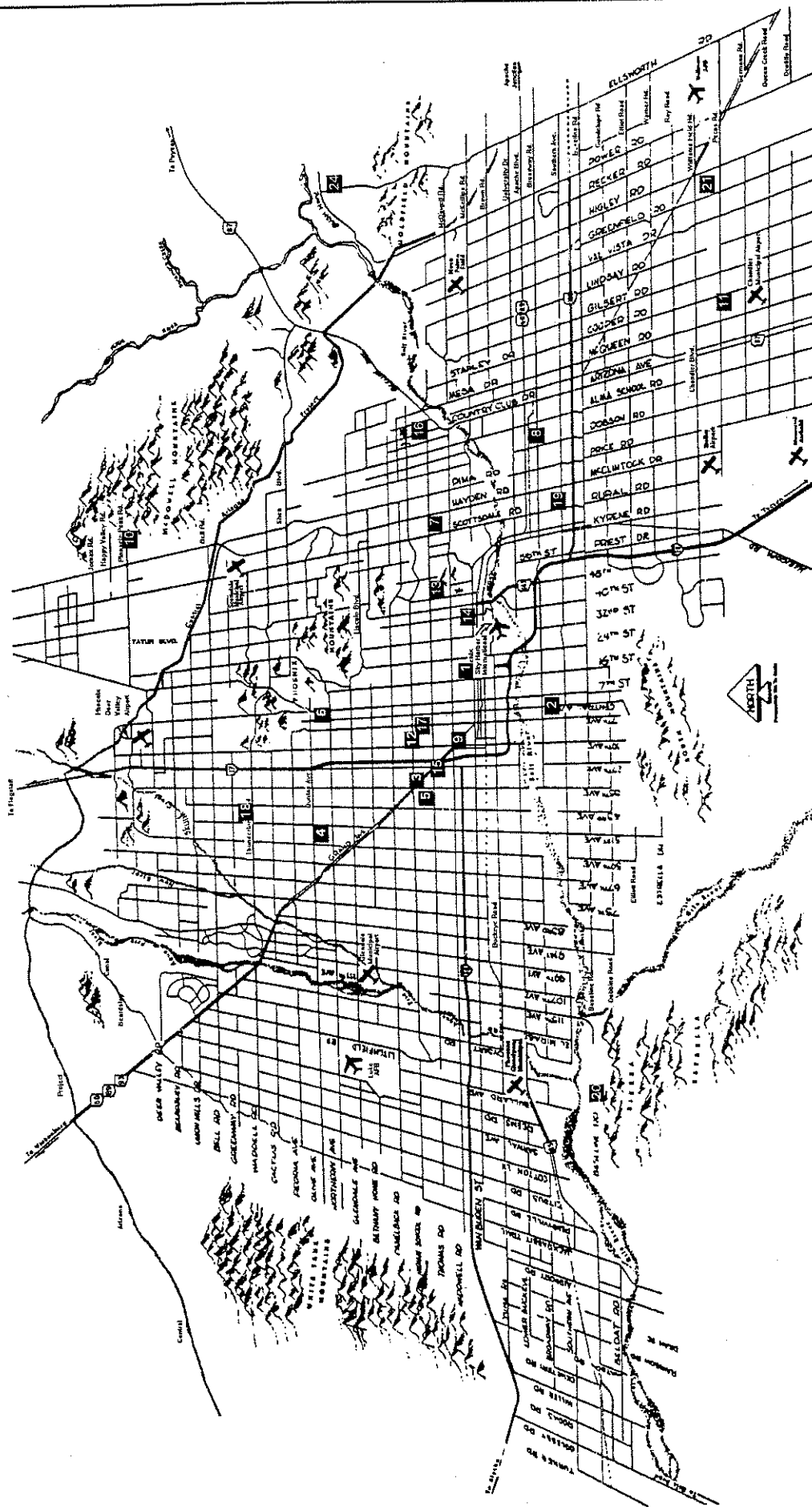


Figure 1

MARICOPA COUNTY MONITORING NETWORK

Map Key for Figure 1 Maricopa County Monitoring Network

Map Number	Site
1	1845 East Roosevelt - Phoenix
2	4732 South Central - Phoenix
3	3315 West Indian School - Phoenix
4	6000 West Olive - Glendale
5	3847 West Earll - Phoenix
6	601 East Butler - Phoenix
7	2857 North Miller - Scottsdale
8	Broadway & Brooks - Mesa
9	1826 West McDowell - Phoenix
10	25000 North Windy Walk - Scottsdale
11	1475 East Pecos - Chandler
12*	4530 N. 17th Avenue - Phoenix
13*	2035 North 52nd Street - Phoenix
14*	600 North 40th Street - Phoenix
15*	27th Avenue/Grand/Thomas - Phoenix
16*	10005 East Osborn - Scottsdale
17*	3905 North 7th Avenue - Phoenix
18*	4701 West Thunderbird - Phoenix
19*	3340 South Rural - Tempe
20*	15099 West Casey Abbott - Goodyear
21*	15500 South Higley - Gilbert
22	National Forest Service - Humboldt Mtn.
23	National Forest Service - Mount Ord
24	Sheriff's Station - Blue Point

* State operated

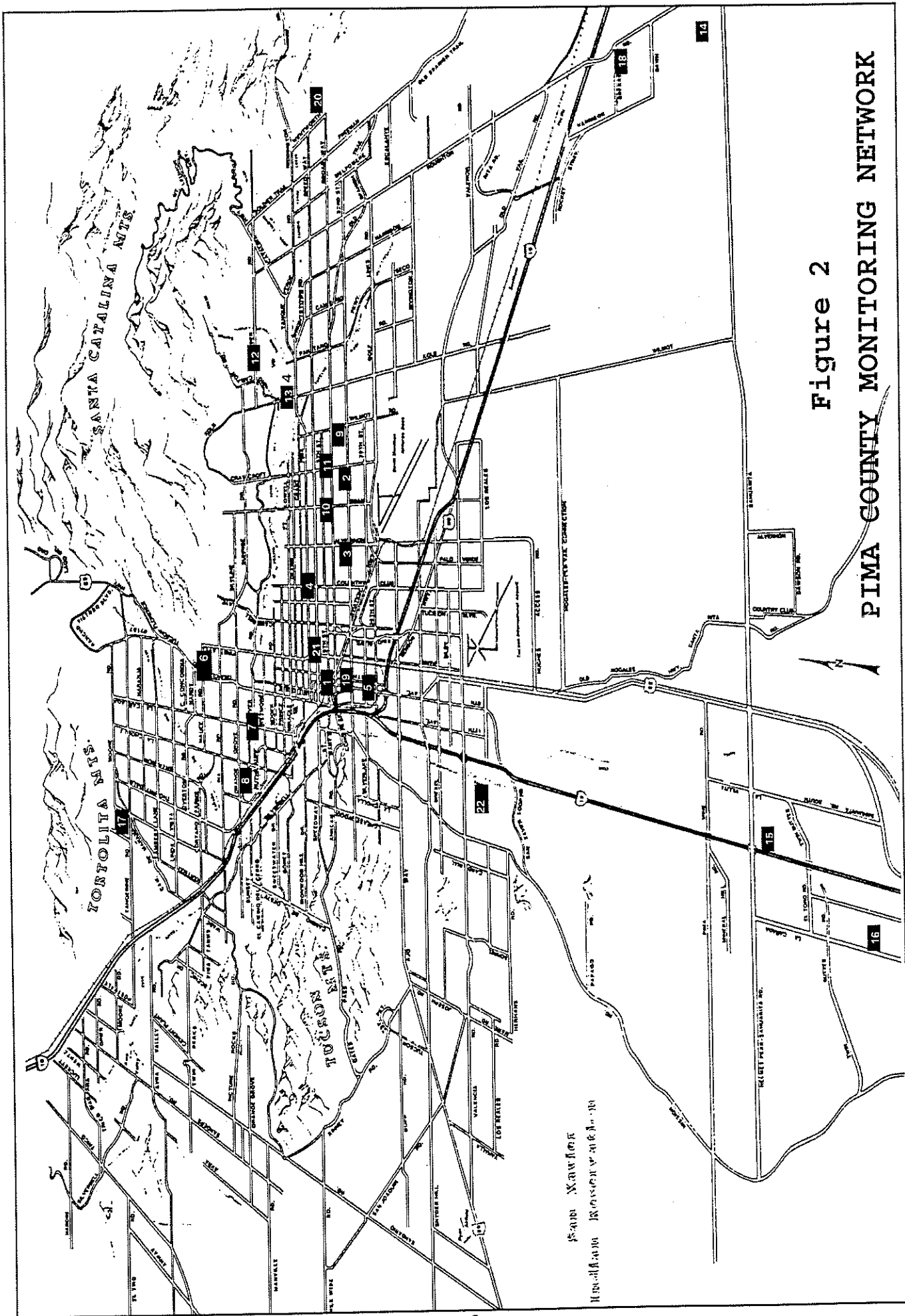


Figure 2
PIMA COUNTY MONITORING NETWORK

Map Key for Figure 2

Pima County Monitoring Network

Map Number	Site
1	190 West Pennington
2	22nd & Craycroft
3	22nd & Alvernon
4	2745 North Cherry
5	1810 South 6th Avenue - South Tucson
6	1016 West Prince
7	4591 North Pomona
8	3401 West Orange Grove
9	346 North Cloverland - Highland Park
10	2645 East Broadway
11	Broadway & Craycroft
12	4829 North Sabino Canyon
13	7290 East Tanque Verde
14	22000 South Houghton - Corona de Tucson
15	350 West Helmet Peak - Sahuarita Jr. High School
16	241 West Esperanza - Green Valley
17	12101 North Camino de Oeste - Tangerine
18	11330 South Houghton Rd. Pima County Fair Grounds
19	260 South Church - Community Center
20	3905 S. Old Spanish Trail
21	1435 N. Fremont Ave., UofA Respiratory Science Lab
22	6910 S. Santa Clara

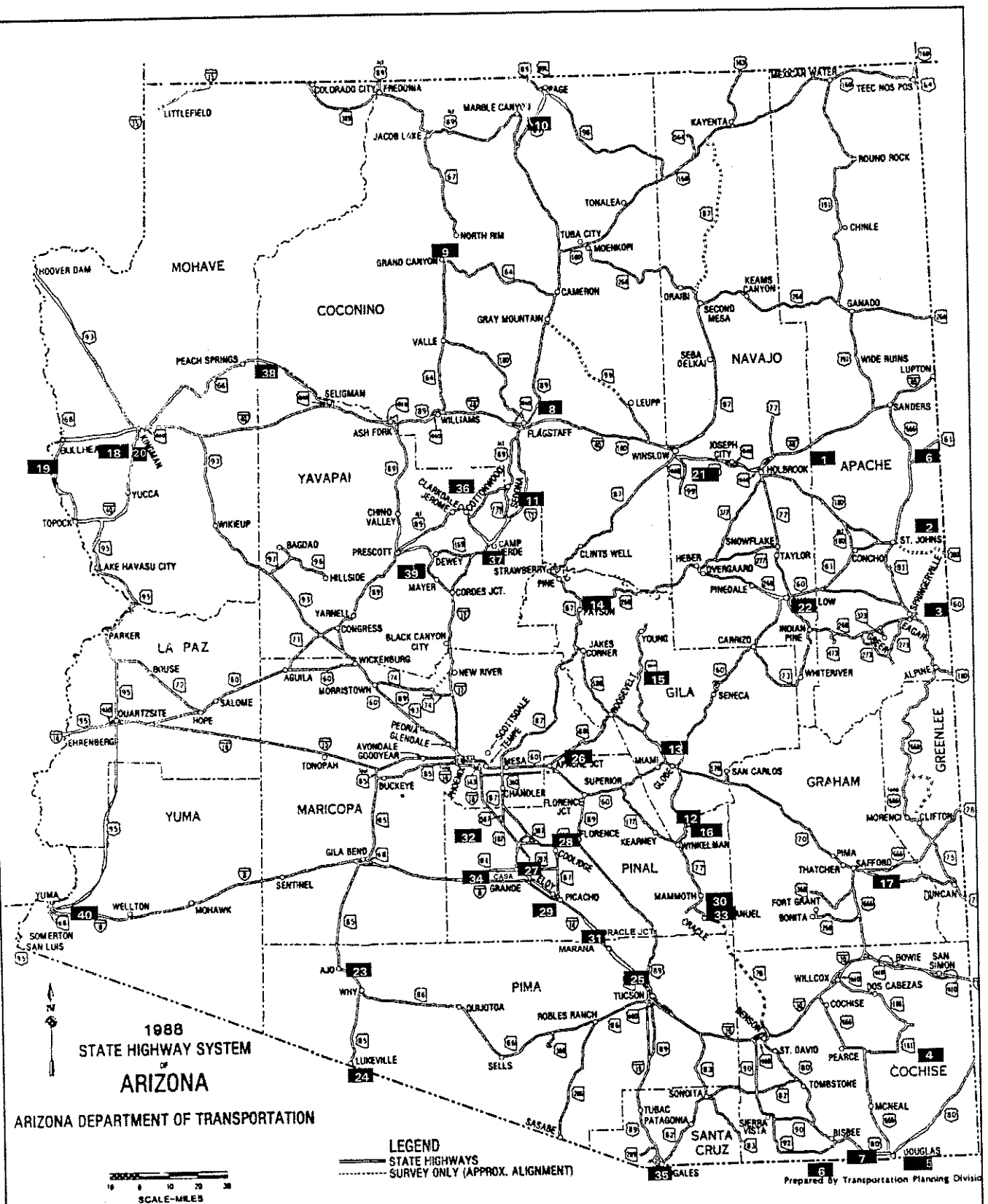


Figure 3
STATE, COUNTY & INDUSTRIAL
MONITORING NETWORK

Map Key for Figure 3 **State, County and Industrial Monitoring Networks**

Map Number	County	Town
1	Apache	Petrified Forest
2		St. Johns
3		Springerville
4	Cochise	Chiricahua
5		Douglas
6		Naco
7		Paul Spur
8	Coconino	Flagstaff
9		Grand Canyon
10		Page
11		Sedona
12	Gila	Hayden
13		Miami
14		Payson
15		Tonto
16		Winkelman
17	Graham	Safford
18	Mohave	Bullhead City
19		Holiday Shores
20		Kingman
21	Navajo	Joseph City
22		Show Low
23	Pima	Ajo
24		Organ Pipe
25		Rillito
26	Pinal	Apache Junction
27		Casa Grande
28		Coolidge
29		Eloy
30		Mammoth
31		Marana
32		Maricopa
33		San Manuel
34		Stanfield
35	Santa Cruz	Nogales
36	Yavapai	Clarkdale
37		Montezuma Castle
38		Nelson
39	Yuma	Prescott
40		Yuma

III. AIR QUALITY DATA FOR 1995

Table 2 lists the counties and towns monitored in the state and the pollutants for which data are listed.

1995 data summaries, which are tabulated in Tables 3 through 8, consist of the following:

- Mean concentrations for the calendar year;
- Highest concentrations for shorter time intervals;
- Number of exceedances of air quality standards; and
- Number of samples collected or hours monitored.

In the data summaries, the following abbreviations and footnotes were used:

General

NA	Not Applicable
NR	Not Reported

Operators

APC	Arizona Portland Cement Company
APS	Arizona Public Service Company
ASARCO	ASARCO
CM	Cyprus Miami Mining Corporation
BHP	BHP Copper, Inc.
Maricopa	Maricopa County Environmental Svcs Department
NPS	National Park Service
Pima	Pima County Department of Environmental Quality
Pinal	Pinal County Air Quality Control District
PRAX	Praxair, Inc.
SRP	Salt River Project
SCE	Southern California Edison Company
State	Arizona Department of Environmental Quality
TEP	Tucson Electric Power Company

Equipment

Carbon Monoxide

GFC

Gas filter correlation

Nitrogen Dioxide

Chem

Chemiluminescent

Ozone

UV

Ultraviolet absorption

PM₁₀

SA321B

Sierra Andersen 321B hi-vol

SA1200

Sierra Andersen 1200 hi-vol

Wed

Wedding hi-vol

Dichot

Dichotomous

Imp.

Improve

Sulfur Dioxide

Fluor

Fluorescent

Table 1

**Summary of Ambient Air Quality Standards
State and Federal Standards ^a
In $\mu\text{g}/\text{m}^3$ (and ppm)**

Pollutant	Averaging Time	Primary	Secondary
Carbon Monoxide ^b	1-hr.	40 (35)	40 (35)
	8-hr.	10 (9)	10 (9)
Nitrogen Dioxide	Annual	100 (.05)	100 (0.5)
Ozone	1-hr.	235 (.12)	235 (.12)
PM ₁₀	24-hr./Annual	150/50	150/50
Sulfur Dioxide	3-hr.	---	1300 (.5)
	24-hr.	365 (.14)	---
	Annual	80 (0.3)	---
Lead	Calendar Qtr.	1.5	1.5

**Summary of Emergency Episode Levels
State and Federal
In $\mu\text{g}/\text{m}^3$ (and ppm)**

Pollutant	Averaging Time	Alert	Warning	Emergency	Significant Harm
Carbon Monoxide	1-hr.	---	---	---	(125)
	4-hr.	---	---	---	(75)
	8-hr.	(15)	(30)	(40)	(50)
Nitrogen Dioxide	1-hr.	1130 (.6)	2260 (1.2)	3000 (1.6)	3750 (2.0)
	24-hr.	282 (.15)	565 (.3)	750 (.4)	938 (.5)
Ozone	1-hr.	400 (.2)	800 (.4)	1000 (.5)	1200 (.6)
PM ₁₀	24-hr.	350 (-)	420 (-)	500 (-)	600 (-)
Sulfur Dioxide	24-hr.	800 (.3)	1600 (.6)	2100 (.8)	2620 (1.0)

^a Standards are not to be exceeded more than once per year with two exceptions. In the case of ozone and PM₁₀, compliance is determined by the number of days on which the O₃ or PM₁₀ standard is exceeded. The number of exceedance days per year, based on a 3-year running average, is not to exceed 1.0.

^b In mg/m³ (and ppm)

Table 2
1995 Counties and Towns Monitored

County and Town	Carbon Monoxide	Lead	Nitrogen Dioxide	Ozone	PM ₁₀	Sulfur Dioxide
APACHE:						
Petrified Forest		X	X		X	X
St. Johns			X	X	X	X
Springerville			X		X	X
COCHISE:						
Chiricahua		X	X		X	X
Douglas					X	
Naco					X	
Paul Spur					X	
COCONINO:						
Flagstaff					X	
Grand Canyon		X	X		X	X
Page					X	
Sedona					X	
GILA:						
Hayden					X	X
Miami					X	X
Payson					X	
Pinto Valley					X	

Table 2 (Cont'd)
1995 Counties and Towns Monitored

County and Town	Carbon Monoxide	Lead	Nitrogen Dioxide	Ozone	PM ₁₀	Sulfur Dioxide
GILA (Contd.)						
Tonto (NM)		X			X	
Winkelman						X
GRAHAM:						
Safford					X	
MARICOPA:						
Chandler	X			X	X	
Gilbert	X					
Glendale	X			X	X	
Goodyear					X	
Mesa	X			X	X	
Phoenix	X	X	X	X	X	X
Scottsdale	X		X	X	X	X
Tempe					X	
MOHAVE:						
Bullhead City			X		X	X
Alonas Way			X	X	X	X
Kingman					X	
NAVAJO:						
Joseph City					X	
Show Low					X	

Table 2 (Cont'd)
1995 Counties and Towns Monitored

County and Town	Carbon Monoxide	Lead	Nitrogen Dioxide	Ozone	PM ₁₀	Sulfur Dioxide
PIMA:						
Ajo					X	
Green Valley					X	
Organ Pipe (NM)					X	
Rillito					X	
Saguaro			X	X		X
Tucson	X	X	X	X	X	X
PINAL:						
Apache Junction	X			X	X	
Casa Grande	X			X	X	
Coolidge					X	
Eloy					X	
Mammoth					X	
Marana					X	
Maricopa					X	
San Manuel						X
Stanfield					X	
SANTA CRUZ:						
Nogales					X	

Table 2 (Cont'd)
1995 Counties and Towns Monitored

County and Town	Carbon Monoxide	Lead	Nitrogen Dioxide	Ozone	PM ₁₀	Sulfur Dioxide
YAVAPAI:						
Clarkdale					X	
Montezuma Castle (NM)					X	
Nelson					X	
Prescott					X	
YUMA:						
Yuma				X	X	

Table 3
1995 Carbon Monoxide Data (in ppm)

County and City	Site Location	Operator	Method	1-HR AVERAGE		8-HR AVERAGE		NUMBER OF EXCEEDENCES		Number of Samples
				Max	2nd Hi	Max	2nd Hi	Day	Times	
MARICOPA:										
Gilbert	525 N. Lindsay	Maricopa	GFC	4.1	3.8	2.4	2.3	0	0	8654
Chandler	163 S. Price	Maricopa	GFC	7.9	6.6	2.8	2.8	0	0	7961
Glendale	6000 W. Olive	Maricopa	GFC	6.4	6.4	3.8	3.7	0	0	8069
Mesa	Broadway & Brooks	Maricopa	GFC	8.5	8.1	5.7	5.3	0	0	8335
Phoenix	4732 S. Central	Maricopa	GFC	9.5	8.5	5.9	5.2	0	0	8679
Phoenix	1845 E. Roosevelt	Maricopa	GFC	11.7	11.4	9.0	8.6	0	0	8388
Phoenix	601 E. Butler Dr.	Maricopa	GFC	9.1	7.5	4.0	3.8	0	0	8315
Phoenix	3315 W. Indian School Rd.	Maricopa	GFC	11.8	11.7	10.1	9.2	1	1	8681
Phoenix	3847 W. Earll	Maricopa	GFC	11.2	11.1	8.8	8.4	0	0	8418
Phoenix	4530 N. 17th Ave.	State	GFC	9.3 ^d	9.2	7.4	7.3	0	0	4344
Phoenix	27th Ave./Grand/Thomas	State	GFC	13.2 ^d	12.9	10.2	9.9	3	3	4286
Phoenix	3905 N. 7th Ave.	State	GFC	11.2 ^d	10.2	7.6	7.6	0	0	4317
Phoenix	SWC I-10 / 27th AVE.	Maricopa	GFC	11.6	11.2	8.7	8.0	0	0	8182
Phoenix	6180 W. Encanto	Maricopa	GFC	10.7	10.5	8.7	8.1	0	0	8002
Phoenix	3225 W Ocotillo	Maricopa	CFG	9.1	9.0	6.9	6.7	0	0	3694
Scottsdale	2857 N. Miller Rd.	Maricopa	GFC	8.3	8.2	5.6	5.1	0	0	8003

Table 3 (Cont'd)
1995 Carbon Monoxide Data (in ppm)

County and City	Site Location	Operator	Method	1-HR AVERAGE Max	1-HR AVERAGE 2nd Hi	8-HR AVERAGE Max	8-HR AVERAGE 2nd Hi	NUMBER OF EXCEEDENCES Day	NUMBER OF EXCEEDENCES Times	Number of Samples
PIMA:										
Tucson	190 W. Pennington	Pima	GFC	11.3	10.4	5.5	4.5	0	0	8336
Tucson	22nd & Craycroft	Pima	GFC	6.7	6.4	3.0	2.6	0	0	8601
Tucson	22nd & Alvernon	Pima	GFC	11.9	10.6	6.0	5.9	0	0	8669
Tucson	2745 N. Cherry	Pima	GFC	9.2	7.9	4.9	4.5	0	0	8376
Tucson	4591 N. Pomona	Pima	GFC	9.4	7.4	3.8	3.3	0	0	6532
PINAL:										
Apache Junction	County Courthouse	Pinal	GFC	4.7	3.4	1.5	1.3	0	0	6701
Casa Grande	Airport N. Pinal	Pinal	GFC	1.8	1.6	1.1	1.1	0	0	7321

STATE AND FEDERAL STANDARD (ppm): 1-Hour Average **35** 8-Hour Average **9**
(Primary and Secondary)

Footnotes:

- a. New site
- b. Site terminated
- c. Invalid annual average due to insufficient number of samples
- d. Site operated on a seasonal schedule
- e. Site operated on an event basis
- f. Units for Pb are ng/m³
- g. Data for Pb are for particles smaller than 2.5 µm

Table 4
1995 Lead Data (in $\mu\text{g}/\text{m}^3$)
In TSP or PM_{10}

County and City	Site Location	Operator	IN	QUARTERLY AVERAGE				NUMBER OF SAMPLES			
				1	2	3	4	1	2	3	4
APACHE:											
Petrified Frst.	1 mi. N. of Park Headquarters	NPS	PM ₁₀	.91 ^{fg}	.84 ^{fg}	.70 ^{fg}	1.2 ^{fg}	26	22	22	25
COCHISE:											
Douglas	City Park	State	PM ₁₀	.008 ^c	.020	.008	.011	13	15	14	14
Chiricahua NM	Faraway Ranch	NPS	PM ₁₀	3.5 ^{fg}	2.6 ^{fg}	2.0 ^{fg}	2.6 ^{fg}	23	26	27	23
Pirtleville	Fire Station	State	TSP	.001 ^c	.008 ^c	.007 ^c	.010 ^c	12	12	13	13
COCONINO:											
Grand Canyon NP	Hopi Point	NPS	PM ₁₀	.53 ^{fg}	.69 ^{fg}	.59 ^{fg}	1.0 ^{fg}	26	26	27	26
Grand Canyon NP	Indian Gardens	NPS	PM ₁₀	.72 ^{fg}	.82 ^{fg}	.75 ^{fg}	.87 ^{fg}	22	24	20	23
GILA:											
Hayden	Old Town Jail	State	PM ₁₀	.24 ^c	.18 ^c	1.6	.58	12	13	16	15
Tonto	Maintenance Station	NPS	PM ₁₀	4.2 ^{fg}	2.4 ^{fg}	2.3 ^{fg}	3.2 ^{fg}	26	26	27	26
MARICOPA:											
Phoenix	1845 E. Roosevelt	Maricopa	TSP	.057	.023	.035	.053 ^c	15	14	15	9
Phoenix	1826 W. McDowell	Maricopa	TSP	.061	.032	.048	.060 ^c	14	14	14	12
PIMA:											
Organ Pipe	Visitor's Center	State	PM ₁₀	.005 ^c	.005	.003	.017 ^c	13	15	14	13
Tucson	1016 W. Prince Rd.	Pima	TSP	.019	.009	.003	.016	15	15	16	15
Tucson	22nd & Craycroft	Pima	TSP	.0	.0	.007	.005	15	15	16	15

Table 4 (Cont'd)

SANTA CRUZ:

STATE AND FEDERAL STANDARD ($\mu\text{g}/\text{m}^3$):
(Primary and Secondary)

Footnotes:

- New site
- Site terminated
- Invalid annual average due to insufficient number of samples
- Site operated on a seasonal schedule
- Site operated on an event basis
- Units for Pb are ng/m^3
- Data for Pb are for particles smaller than $2.5\ \mu\text{m}$

Table 5
1995 Nitrogen Dioxide Data (in $\mu\text{g}/\text{m}^3$)

County and City	Site Location	Operator	Method	Annual Average	Maximum 1-HR 24-HR	No. of 1-HR Samples
APACHE:						
St. Johns	Mesa Parada	SRP	Chem	7	51 13	8117
Springerville	Airport	TEP	Chem	2	30 9	7709
Springerville	4 mi. NE of town	TEP	Chem	2	51 11	7621
Springerville	1 mi. NNE of unit 1 stack	TEP	Chem	4	62 11	7709
COCONINO:						
Page	Glen Canyon Dam	SRP	Chem	4.0	64 23	8451
MARICOPA:						
Phoenix	4530 N. 17th Ave.	State	Chem	24	182 65	8560
Phoenix	1845 E. Roosevelt	Maricopa	Chem	61	241 113	7592
Phoenix	SWC I-10/27th Ave.	Maricopa	Chem	58	198 113	5558
Phoenix	3847 W. Earll	Maricopa	Chem	54	203 130	7170
Scottsdale	2857 N. Miller Rd.	Maricopa	Chem	48	156 87	7170
MOHAVE:						
Bullhead City	224 N. Main	SCE	Chem	32	109 NR	7748
Alonas Way	1285 Alonas Way	SCE	Chem	15	55 NR	6283
PIMA:						
Tucson	22nd & Craycroft	Pima	Chem	36	134 72	7758
Tucson	4591 N. Pomona Avenue	Pima	Chem	38	147 72	8680

STATE AND FEDERAL STANDARD ($\mu\text{g}/\text{m}^3$):
(Primary and Secondary) Annual Average
100

Footnotes:

- a. New site
- b. Site terminated
- c. Invalid annual average due to insufficient number of samples
- d. Site operated on a seasonal schedule
- e. Site operated on an event basis
- f. Units for Pb are ng/m^3
- g. Data for Pb are for particles smaller than $2.5 \mu\text{m}$

Table 6
1995 Ozone Data (in ppm)

County and City	Site Location	Operator	Method	1-HR MAX Day	2nd HI Day	Number of Exceedances	Number of Samples
APACHE:							
St. Johns	Mesa Parada	SRP	UV	.08	.08	0	8548
COCONINO:							
Grand Canyon	2 mi. W. of Hopi Point	NPS	UV	.08	.08	0	8009
Page	Glen Canyon Dam	SRP	UV	.07	.07	0	8681
MARICOPA:							
Blue Point ^a	Sheriff's Station	Maricopa	UV	.13	.13	2	1505
Chandler	163 S. Price	Maricopa	UV	.13	.12	1	8481
Glendale	6000 W. Olive	Maricopa	UV	.12	.11	0	8084
Humbolt Mtn. ^a	USFS Building	Maricopa	UV	.10	.09	0	2398
Mesa	Broadway & Brooks	Maricopa	UV	.13	.13	3	8320
Mesa	4530 E. McKellips Rd.	Maricopa	UV	.13	.13	2	5581
Mesa	6001 S. Power Rd.	State	UV	.14	.13	2	3437
Mount Ord ^a	USFS Building	Maricopa	UV	.11	.10	0	3447
Phoenix	2035 52nd St.	Maricopa	UV	.14	.14	7	5257
Phoenix	1845 E. Roosevelt	Maricopa	UV	.12	.12	0	8391
Phoenix	601 E. Butler	Maricopa	UV	.14	.13	3	8363
Phoenix	600 N. 40th St.	State	UV	.13	.13	2	3205
Phoenix	3847 W. Earll	Maricopa	UV	.12	.12	0	8231
Phoenix	4732 S. Central	Maricopa	UV	.14	.11	1	8726
Phoenix	4530 N. 17th Ave.	State	UV	.14	.13	3	3438
Phoenix	6180 W. Encanto	Maricopa	UV	.12	.12	0	7917
Scottsdale	2857 N. Miller	Maricopa	UV	.13	.12	1	8307

Table 6 (Cont'd)
1995 Ozone Data (in ppm)

County and City	Site Location	Operator	Method	1-HR MAX Day	2nd HI Day	Number of Exceedances	Number of Samples
MARICOPA (Cont'd):							
Scottsdale	25000 N. Windy Walk	Maricopa	UV	.12	.12	0	7705
Scottsdale	10005 E. Osborn	State	UV	.13	.13	2	3085
MOHAVE:							
Alonas Way	1285 Alona Way	SCE	UV	.08	.08	0	7195
PIMA:							
Saguaro NM E	3905 S. Old Spanish Trail	Pima	UV	.12	.11	0	8485
Tucson	190 W. Pennington	Pima	UV	.09	.08	0	8624
Tucson	22nd & Craycroft	Pima	UV	.11	.10	0	8622
Tucson	4591 N. Pomona	Pima	UV	.10	.10	0	8587
Tucson	11330 S. Houghton	Pima	UV	.10	.09	0	8504
Tucson	12101 N. Camino de Oeste	Pima	UV	.09	.09	0	8700
Tucson	4829 W. Sabino Canyon Rd.	Pima	UV	.08	.08	0	8514
PINAL:							
Apache Junction	County Court House	Pinal	UV	.14	.12	1	7776
Casa Grande	Airport - N. Pinal	Pinal	UV	.08	.08	0	8638
YUMA:							
Yuma	1485 Second Ave.	State	UV	.11 ^d	.09	0	3928

STATE AND FEDERAL STANDARD: The standard is .12ppm (235 $\mu\text{g}/\text{m}^3$) for the maximum daily 1-hour concentration, not to be exceeded (Primary and Secondary) more than three times in three years. No more than 1.0 exceedances per year over the last three years is permitted.

Footnotes:

- a. New site
- b. Site terminated
- c. Invalid annual average due to insufficient number of samples
- d. Site operated on a seasonal schedule
- e. Site operated on an event basis
- f. Units for Pb are ng/m^3
- g. Data for Pb are for particles smaller than 2.5 μm

Table 7
1995 PM₁₀ Data (in $\mu\text{g}/\text{m}^3$)

County and City	Site Location	Operator	Method	Annual Average	24-Hour Average MAX 2nd Hi	Number of Exceedances 150 $\mu\text{g}/\text{m}^3$	Number of Samples
APACHE:							
Petrified Forest	1 mi. from Visitor Center	NPS	Improve	7	24 22	0	94
St. Johns	Mesa Parada	SRP	Dichot	7	25 22	0	58
St. Johns	Patterson Wellfield	SRP	Dichot	10	53 39	0	59
Springerville	Coyote Hills 105m SSW of stack	TEP	Dichot	9	29 28	0	109
Springerville	Plant 1 mi. NE of stack	TEP	Dichot	12	73 60	0	109
COCHISE:							
Chiricahua NM	Faraway Ranch	NPS	Improve	10	32 28	0	96
Douglas	City Park	State	Dichot	32	63 57	0	58
Douglas ^a	City Park	State	Teom	58 ^c	299 204	6	2095
Naco	Port of Entry	State	SA1200	45	141 94	0	53
Paul Spur	Housing area	State	Dichot	33	77 77	0	54
COCONINO:							
Flagstaff	5701 E. Railroad Ave.	State	Wedd'g	15	32 30	0	59
Flagstaff	Thorpe Park	State	Dichot	21	43 42	0	52
Grand Canyon	Hopi Point	NPS	Improve	7	19 18	0	101
Grand Canyon	Indian Gardens	NPS	Improve	10	24 23	0	88
Nelson	1 mile W. Lime Plant	State	Dichot	18	70 49	0	53
Sedona	Post Office	State	SA322	11 ^c	24 22	0	44

Table 7 (Cont'd)
1995 PM₁₀ Data (in $\mu\text{g}/\text{m}^3$)

County and City	Site Location	Operator	Method	Annual Average	24-Hr Average MAX 2nd Hi	Number of Exceedances 150 $\mu\text{g}/\text{m}^3$	Number of Samples
GILA:							
Hayden	Old Town Jail	State	Dichot	34	108 90	0	56
Miami	Golf Course	CMMC	Dichot	31	74 71	0	119
Miami	Ridgeline	CMMC	Dichot	15	49 46	0	115
Miami ^a	Post Office	State	Teom	30 ^c	141 79	0	2180
Payson	USWest Building	State	Dichot	39	187 151	0	49
Tonto	Maintenance Station	NPS	Improve	10	30 26	0	101
GRAHAM:							
Safford	523 Tenth Ave.	State	SA1200	33	130 87	0	60
MARICOPA:							
Chandler	1475 E. Pecos Rd.	Maricopa	SA1200	53	252 160	2	146
Gilbert ^a	15500 S. Higley	State	Dichot	55	110 106	0	55
Glendale	6000 W. Olive	Maricopa	SA321B	33	70 63	0	53
Goodyear ^a	15099 W. Casey Abbott	State	Dichot	29 ^c	86 65	0	44
Mesa	Broadway & Brooks	Maricopa	SA1200	35	89 70	0	57
Phoenix	4732 S. Central	Maricopa	SA321B	46	78 74	0	50
Phoenix	3847 W. Earll	Maricopa	SA321B	44	99 88	0	61
Phoenix	1845 E. Roosevelt	Maricopa	SA321B	44	88 76	0	55
Phoenix ^a	4701 W. Thunderbird	State	Dichot	29	57 51	0	51
Phoenix	4530 N. 17th Ave.	State	Teom	25 ^c	73 63	0	2084
Phoenix	4530 N. 17th Ave.	State	Dichot	31	71 59	0	56

Table 7 (Cont'd)
1995 PM₁₀ Data (in $\mu\text{g}/\text{m}^3$)

County and City	Site Location	Operator	Method	Annual Average	24-Hr Average MAX 2nd HI	Number of Exceedances 150 $\mu\text{g}/\text{m}^3$	Number of Samples
MARICOPA (cont'd):							
Phoenix	601 E. Butler	Maricopa	SA321B	36	84 68	0	58
Scottsdale	2857 N Miller Rd.	Maricopa	SA321B	36	75 69	0	61
Tempe ^a	3340 S. Rural	State	Dichot	31	63 62	0	58
MOHAVE:							
Bullhead City ^a	224 N. Main	State	Teom	26 ^c	68 67	0	2232
Bullhead City ^b	224 N. Main	SCE	SA321B	36	73 71	0	61
Alonas Way	1285 Alonas Way	SCE	SA321B	24	49 44	0	53
Kingman	I-40 and Griffith Rd.	PRAXAIR	SA1200	9.1	32 30	0	93
NAVAJO:							
Joseph City ^b	Third & Tanner	APS	Wedd'g	16 ^c	40 31	0	44
Joseph City	N. Bushman N. Of 4th N.	APS	Wedd'g	12 ^c	20 19		14
Show Low	Deuce of Clubs Ave.	State	Wedd'g	16 ^c	39 25	0	31
PIMA:							
Ajo	Well Road	State	Dichot	24	54 54	0	59
Corona de Tucson	22000 S. Houghton	Pima	SA1200	15	46 43	0	54
Green Valley	245 W. Esperanza	Pima	SA1200	16	39 34	0	60
Organ Pipe NM	Visitors Center	State	Dichot	9	26 19	0	55
Rillito	8820 W. Water	State	Dichot	35	92 54	0	54
Rillito	Gremler Residence	APCC	Wedd'g	29	54 50	0	121
Tucson	Broadway & Swan	Pima	SA1200	28	75 53	0	61
Tucson	6910 S. Santa Clara	Pima	SA1200	27	81 54	0	59

Table 7 (Cont'd)
1995 PM₁₀ Data (in $\mu\text{g}/\text{m}^3$)

County and City	Site Location	Operator	Method	Annual Average	24-Hr Average MAX 2nd Hi	Number of Exceedances 150 $\mu\text{g}/\text{m}^3$	Number of Samples
PIMA (Cont'd) :							
Tucson	360 S. Church	Pima	SA1200	31	103 69	0	245
Tucson	.5m E. Irvington & Alvernon	TEP	SA321B	22	50 50	0	55
Tucson	3401 W. Orange Grove	Pima	SA321B	34	107 106	0	61
Tucson	3401 W. Orange Grove	State/Pima	Dichot	30	69 49	0	60
Tucson	1016 W. Prince Rd.	Pima	SA1200	38	132 70	0	57
Tucson	1810 S. 6th Ave.	Pima	SA1200	31	77 58	0	60
Tucson	22nd/Craycroft	State/Pima	Dichot	35	106 63	0	61
Tucson	12101 N. Camino de Oeste	State/Pima	Dichot	15	44 34	0	61
Tucson	11330 S. Houghton Rd.	State/Pima	Dichot	14	43 37	0	61
Tucson	1435 N. Fremont	State/Pima	Dichot	32	89 59	0	61
PINAL:							
Apache Junction	South County Courthouse	Pinal	Wedd'g	21	68 52	0	57
Apache Junction	North County Courthouse	Pinal	Wedd'g	26	68 49	0	58
Casa Grande	401 Marshall Rd.	Pinal	Wedd'g	29	77 70	0	59
Coolidge	County Highway Yard	Pinal	Wedd'g	35	95 89	0	58
Eloy	Eloy Fire Department	Pinal	SA321B	38	130 90	0	58
Mammoth	County Courthouse	Pinal	SA1200	23	81 51	0	55
Marana	Pinal Air Park	Pinal	SA1200	26	65 59	0	59
Maricopa	Edwards Residence	Pinal	SA321B	46	151 88	0	56
Stanfield	County Courthouse	Pinal	Wedd'g	28	86 63	0	55

Table 7 (Cont'd)
1995 PM₁₀ Data (in µg/m³)

County and City	Site Location	Operator	Method	Annual Average	24-Hr Average MAX 2nd HI	Number of Exceedances 150 µg/m ³	Number of Samples
SANTA CRUZ:							
Nogales	U.S. Post Office	State	Dichot	43	123 107	0	55
YAVAPAI:							
Clarkdale	SE of CTI Flyash Silos	PC	Dichot	33	148 83	0	56
Clarkdale	Clarkdale School	State	Dichot	17	30 29	0	56
Clarkdale	Northwest of Cement Plant	PC	Dichot	17	54 39	0	58
Hillside	Sheriff's Repeater St.	State	Dichot	10 ^c	42 20	0	42
Montezuma Castle	Maintenance Building	State	Dichot	13	26 26	0	53
Nelson	Chemstar Lime Plant	State	Dichot	18	70 47	0	53
Prescott	City Administration	State	Wedd'g	14	23 22	0	48
YUMA:							
Yuma	2795 Avenue B	State	Dichot	35	75 72	0	47
STATE AND FEDERAL STANDARDS (ug/m³):				Annual Arithmetic Mean	24-Hour Average		
(Primary and Secondary)				50	150		

Footnotes:

- New site
- Site terminated
- Invalid annual average due to insufficient number of samples
- Site operated on a seasonal schedule
- Site operated on an event basis
- Units for Pb are ng/m³
- Data for Pb are for particles smaller than 2.5 µm

Table 8
1995 Sulfur Dioxide Data (in $\mu\text{g}/\text{m}^3$)

County and City	Site Location	Operator	Method	Annual Average	MAX 3-Hr 24-Hr	NO. OF EXCEEDANCES 3-Hr Days 24-Hr Times	1-Hr Samples
APACHE:							
St. Johns	Mesa Parada	SRP	Fluor	7	63 17	0 0	8124
Springerville	4 mi. NE of town	TEP	Fluor	0	107 21	0 0	7574
Springerville	Airport	TEP	Fluor	0	31 8	0 0	7379
Springerville	1 mi. NNE-unit 1 stack	TEP	Fluor	3	215 39	0 0	7537
COCONINO:							
Page	Glen Canyon Dam	SRP	Fluor	7	131 46	0 0	8615
GILA:							
Hayden	Garfield Ave.	ASARCO	Fluor	23	1125 195	0 0	8464
Hayden	Jail	ASARCO	Fluor	21	393 96	0 0	8494
Hayden	Hayden Junction	ASARCO	Fluor	13	416 77	0 0	8392
Hayden	Montgomery Ranch	ASARCO	Fluor	52	950 256	0 0	8407
Hayden	Jail	State	Fluor	18	435 97	0 0	8531
Miami	Ridgeline - Linden St.	State	Fluor	10	244 89	0 0	7972
Miami	Jones Ranch	CMMC	Fluor	8	433 122	0 0	8760
Miami	Whrfld./Burch Pump Station	CMMC	Fluor	1	63 21	0 0	8760
Miami	Town Site	CMMC	Fluor	6	280 56	0 0	8760
Winkelman	1 mile north Jct. 77 & 177	ASARCO	Fluor	39	1084 233	0 0	8395
MARICOPA:							
Phoenix	1845 E. Roosevelt	Maricopa	Fluor	5	49 28	0 0	8305
Phoenix	3847 E. Earll	Maricopa	Fluor	4	21 11	0 0	7508
Scottsdale	2857 N. Miller Rd.	Maricopa	Fluor	4	26 19	0 0	5309

Table 8 (Cont'd)
1995 Sulfur Dioxide Data (in $\mu\text{g}/\text{m}^3$)

County and City	Site Location	Operator	Method	Annual Average	MAX 3-Hr 24-Hr	NO. OF EXCEEDANCES 3-Hr. Days 24-Hr. Times	1-Hr Samples
MOHAVE:							
Bullhead City ^b	224 N. Main	SCE	Fluor	3	157 34	0 0	8497
Alonas Way	1285 Alonas Way	SCE	Fluor	8	139 39	0 0	8410
PIMA:							
Tucson	22nd & Craycroft	Pima	Fluor	4	32 10	0 0	8559
PINAL:							
San Manuel	Townsite	BHP (Magma)	Fluor	11	372 71	0 0	8753
San Manuel	Golf Course	BHP (Magma)	Fluor	12	585 184	0 0	8727
San Manuel	Dormsite	BHP (Magma)	Fluor	16	317 96	0 0	8746
San Manuel	LDS Church	State	Fluor	8	367 55	0 0	8491
San Manuel	Hospital	BHP (Magma)	Fluor	18	593 141	0 0	8752
STATE AND FEDERAL STANDARDS ($\mu\text{g}/\text{m}^3$):							
Primary	Annual Average	24-Hour Average	3-Hour Average	80	365	---	---
Secondary	---	---	1300	---	---	---	---

Footnotes:

- New site
- Site terminated
- Invalid annual average due to insufficient number of number of samples
- Site operated on a seasonal schedule
- Site operated on an event basis
- Units for Pb are ng/m^3
- Data for Pb are for particles smaller than $2.5 \mu\text{m}$

IV. AIR QUALITY TRENDS

A. CARBON MONOXIDE

In Phoenix carbon monoxide concentrations decreased steadily from 1986 through 1993 at both trend sites (See Figure 4). However, in 1994 and 1995 the second highest 8-hour concentrations increased at these sites. The second highest 8-hour concentrations for each year was selected as the trend indicator because the first highest value does not count as a violation. To represent the Phoenix metropolitan area the neighborhood scale site at 1845 E. Roosevelt Street and the micro scale site at 3315 W. Indian School Road were chosen.

In Tucson concentrations followed a similar pattern, decreasing through 1993 and increasing in 1994. However, there was no increase in 1995 as there was in Phoenix. For the Tucson urban area the micro scale site at 22nd and Alvernon was selected. These monitoring stations were chosen because they have a long-term database, and they monitor the highest concentrations.

As an additional check on trends, the number of exceedances of the 8-hour standard were plotted in Figure 5. It can be seen that the decreasing trend in carbon monoxide levels is exaggerated in this graph. Thus, a more accurate representation of trends is provided by the second highest 8-hour concentrations. Nevertheless, the exceedance data is important for determining the compliance status of the Phoenix and Tucson urban areas. In addition, this data is essential in evaluating the effectiveness of control measures for carbon monoxide.

B. LEAD

A substantial decrease in lead concentrations in Phoenix and Tucson was monitored from 1985 through 1989 as indicated by Figure 6. Subsequently, lead levels in both cities have remained at 0.05 to 0.10 $\mu\text{g}/\text{m}^3$. This is well below the air quality standard, 1.5 $\mu\text{g}/\text{m}^3$ for the maximum quarterly average. Prior to 1985 lead concentrations had also declined each year as a result of reduced lead emissions from motor vehicles.

C. NITROGEN DIOXIDE

No long-term data for nitrogen dioxide for the Phoenix area is available due to problems with equipment operation and quality assurance. However, the limited amount of data collected in recent years indicates that the annual average has varied from 25 to 50 $\mu\text{g}/\text{m}^3$. These values are far below the annual standard of 100 $\mu\text{g}/\text{m}^3$. Likewise, Tucson data indicates compliance with the annual standard with measurements in the range of 30 to 40 $\mu\text{g}/\text{m}^3$ since 1984.

D. OZONE

In Phoenix ozone concentrations have decreased and increased from year to year since 1986 (See Figure 7). From a long-term perspective, however, no significant change in the second highest 1-hour concentrations is evident. A different pattern is observed in the exceedance data plotted in Figure 8. The number of exceedances of the ozone standard decreased from 1986 through 1989. Then, in 1990 the number of exceedances rose sharply followed by a series of variations from year to year. However, the data indicate an increasing trend over the past six

years. The year to year variations in exceedances are largely due to changes in meteorological conditions. Thus, like carbon monoxide trends, ozone trends are more accurately reflected by second highest concentration data. Exceedance data are more useful for determining the compliance status of the Phoenix urban area. Also, they are necessary for assessing the benefits of ozone control measures.

E. PM₁₀

In the Phoenix urban area annual average concentrations have been relatively constant in recent years (See Table 9). No exceedances of the annual standard have been monitored at any site except Chandler, where they occurred in 1992, 1993 and 1996. In regard to the 24-hour standard, there have been a number of exceedances of the 24-hour standard at the West Phoenix, South Phoenix, Chandler, and Salt River sites. However, these exceedances are not useful for indicating long-term trends because they were caused by local activities.

In the Tucson area PM₁₀ concentrations have been lower than in the Phoenix area (See Table 10). Also, it should be noted that no exceedances of the annual standard have been monitored in Tucson. For the most part annual average concentrations have not changed significantly from year to year. This trend is expected for the Corona de Tucson site which represents background conditions for the Tucson airshed. One site, Prince Road, has monitored changes in annual average concentrations. At this site there was an apparent reduction in PM₁₀ concentrations in 1991 relative to 1990. Four years later, in 1995, concentrations appear to have increased. Finally, it should be noted that no exceedances of the 24-hour standard have been monitored in Tucson since 1988 when two exceedances were measured at the Orange Grove Road site.

At other sites in Arizona, PM₁₀ annual average concentrations have not varied appreciably in the last six years (See Table 11). This is to be expected at the Montezuma Castle and Organ Pipe sites which represent background conditions. Paul Spur is the only site which has monitored significant changes in PM₁₀ concentrations. At this site concentrations have decreased substantially since 1991. As a result, Paul Spur is now in compliance with the annual and 24-hour standards.

Finally, it should be noted that a number of sites appear to have monitored higher concentrations in 1990 and 1991 than in subsequent years. This is an anomaly in the database caused by two factors. One factor was the change from high volume samplers to dichotomous samplers in 1990 and 1991. The other factor was a QA/QC problem in operating the high volume samplers prior to 1992.

F. SULFUR DIOXIDE

Sulfur dioxide concentrations were in compliance with air quality standards 1995 in Arizona. In fact very few exceedances of sulfur dioxide standards have been monitored over the past six years (See Figure 9). In Figure 9 the number of 3-hour exceedances are plotted as the trend indicator because this is the most restrictive standard for sulfur dioxide. Miami continues to have the best record among the three smelter towns with no exceedances since 1987.

FIGURE 4

CARBON MONOXIDE CONCENTRATIONS IN PHOENIX AND TUCSON

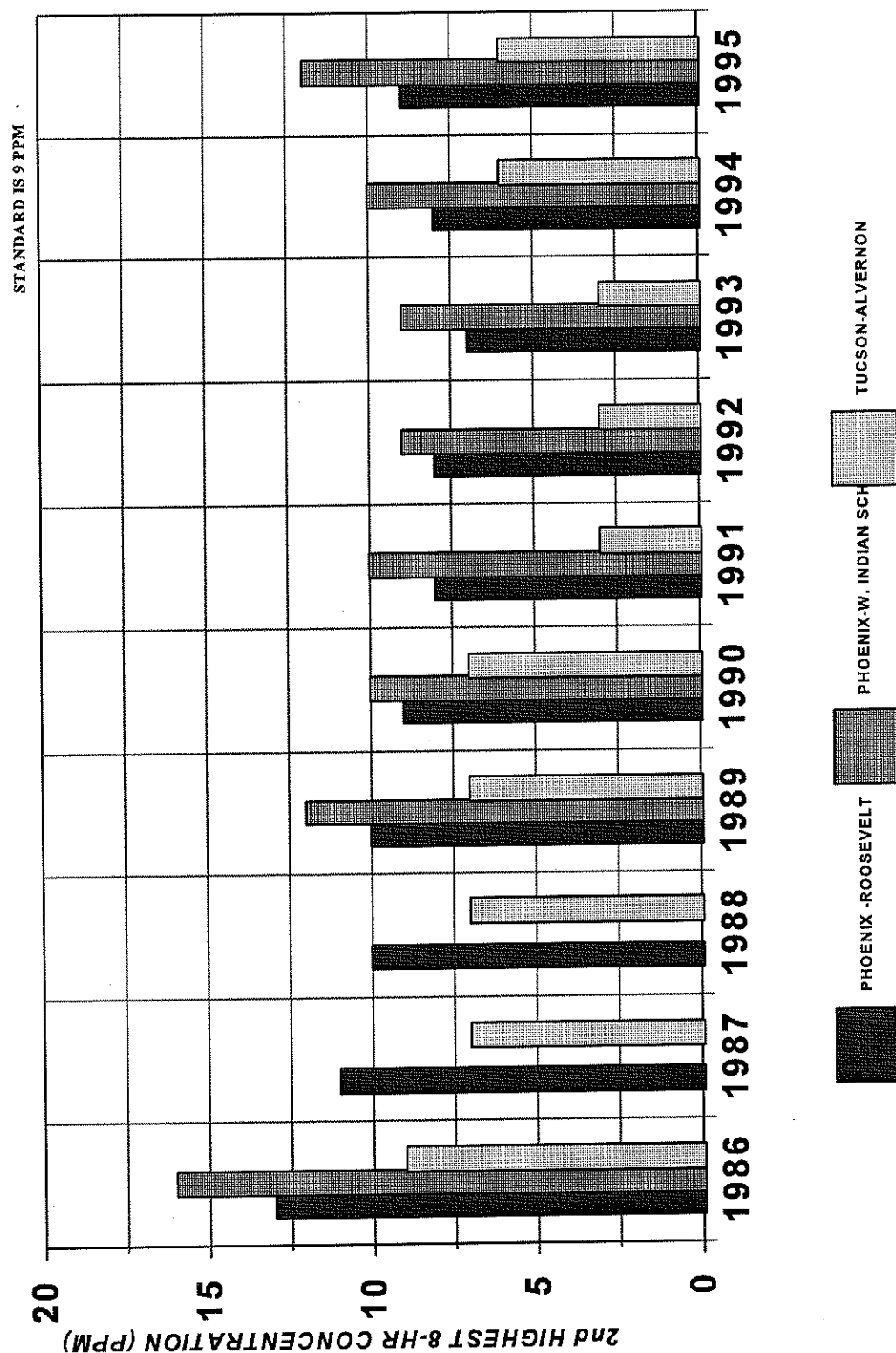
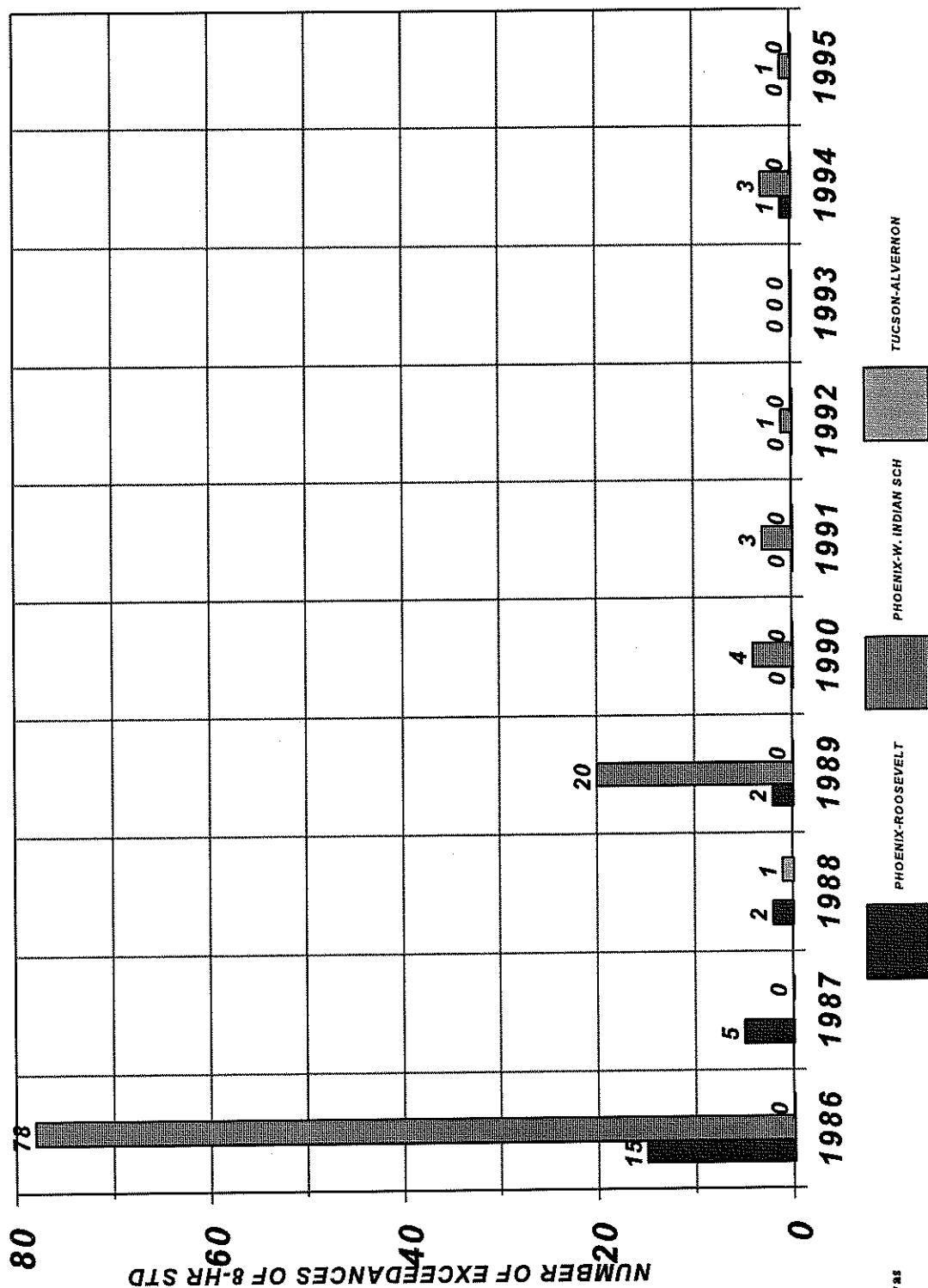


FIGURE 5

CARBON MONOXIDE EXCEEDANCES IN PHOENIX AND TUCSON

STANDARD IS 9 PPM



1987-1988 W.
Indian School was
shutdown.

FIGURE 6

LEAD CONCENTRATIONS IN PHOENIX AND TUCSON

STANDARD IS 1.5 (ug/m³)

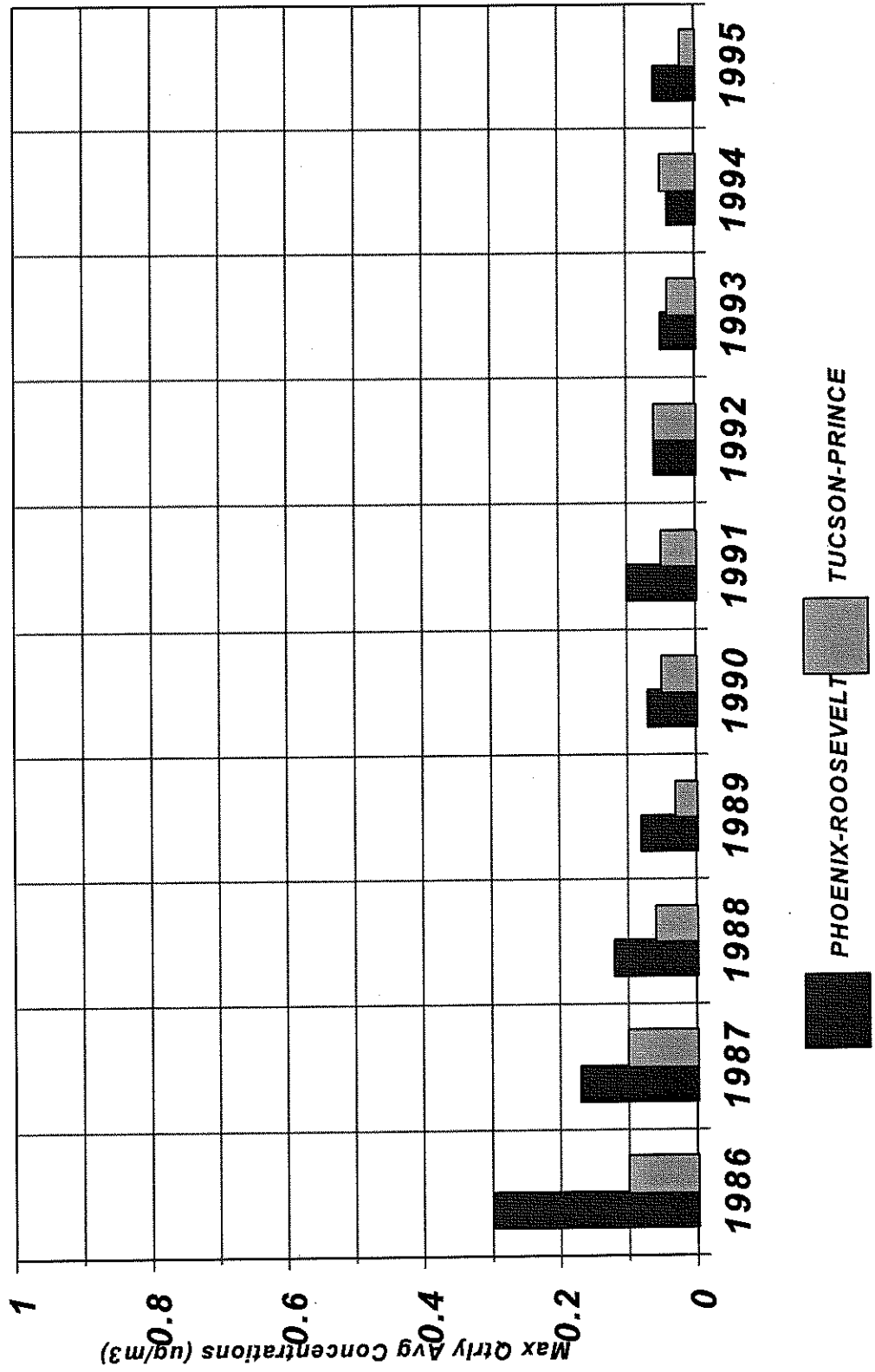


FIGURE 7

OZONE CONCENTRATIONS IN PHOENIX, TUCSON AND YUMA

STANDARD IS .12 PPM

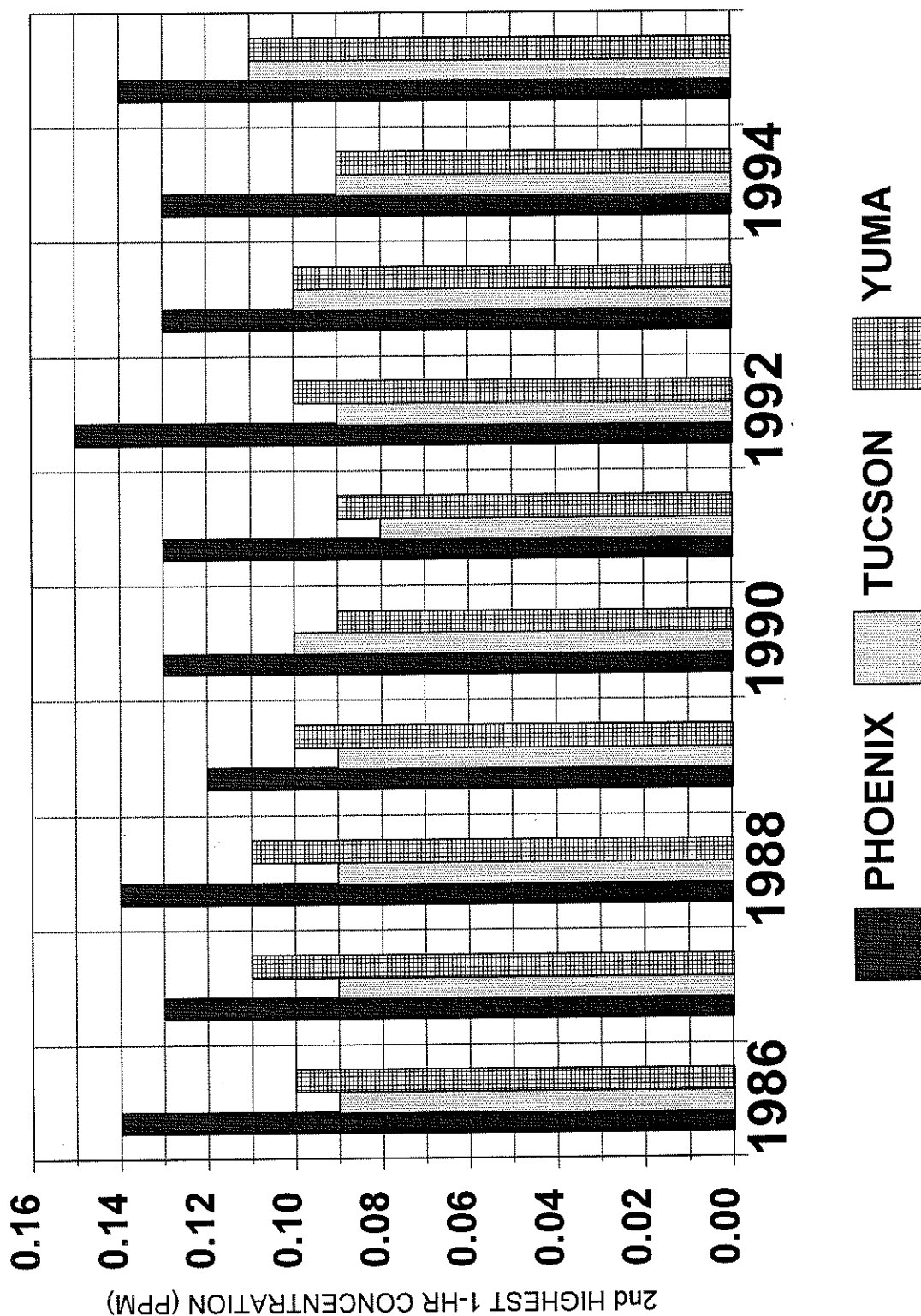


FIGURE 8

OZONE EXCEEDANCES
IN PHOENIX AREA

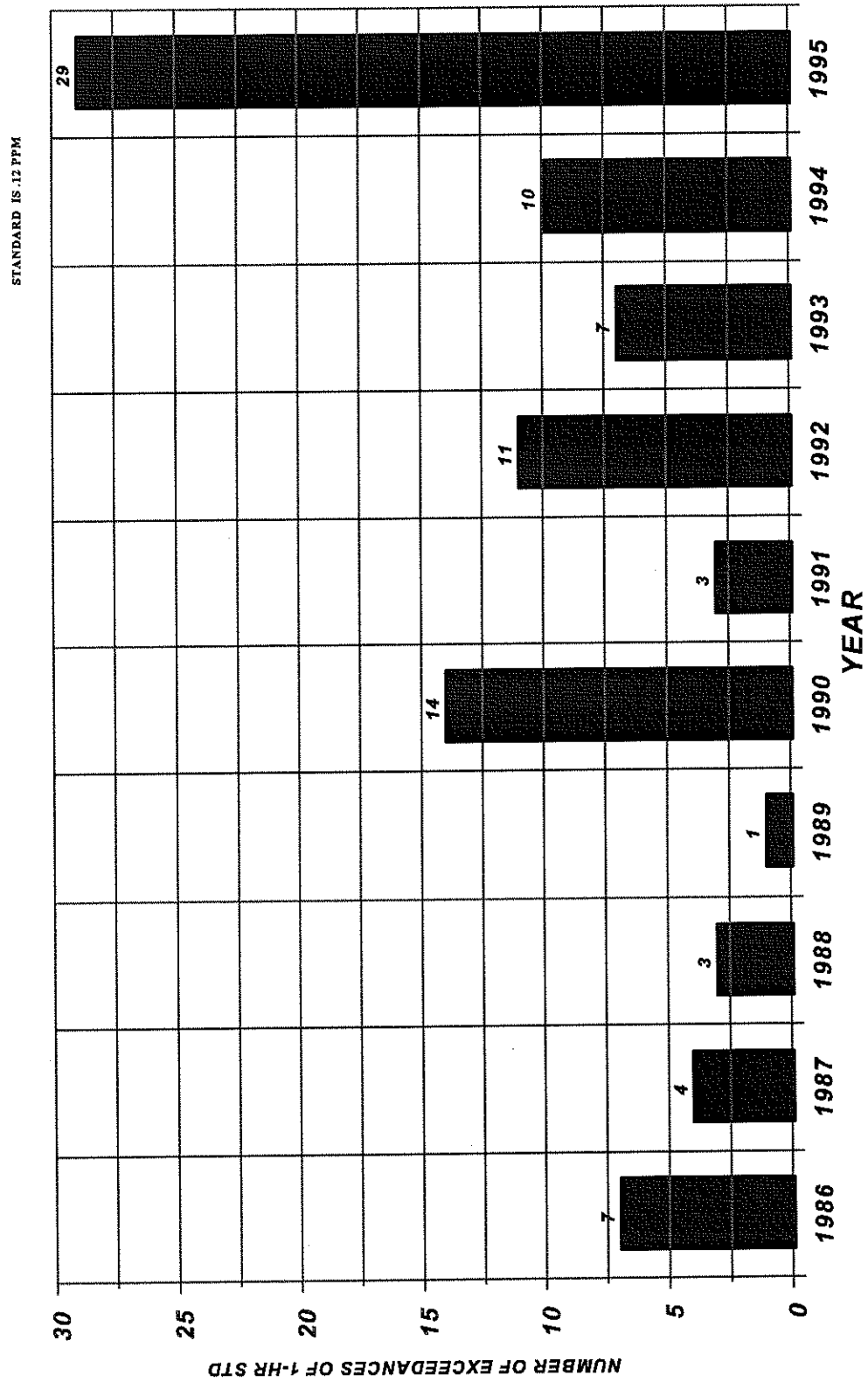


Table 9
PM₁₀ Concentrations in Phoenix Urban Area
Annual Average (μg/m³)

SITE	1990	1991	1992	1993	1994	1995
Central Phoenix	47 ^a	46	42 ^a	43 ^a	43	44
Chandler	50 ^a	50	56 ^a	58 ^a	50	53
Glendale	46 ^a	42	34 ^a	35	33	33
North Phoenix	47	45	35 ^a	34	35	36
South Phoenix	41	44	48	44	44	46
West Phoenix	48	47	47 ^a	44	43	44
Mesa	37	36	29 ^a	35	36 ^a	35
South Scottsdale	39	34	34	34 ^a	38	36

^a Invalid annual average due to insufficient number of samples
Annual standard - 50 μg/m³

Table 10
PM₁₀ Concentrations in Tucson Urban Area
Annual Average (μg/m³)

SITE	1990	1991	1992	1993	1994	1995
South Tucson	46	34	32	32	27	31
Prince Road	43 ^a	32	28	24	25	38
Corona de Tucson	16	13	12	12	13	15
Green Valley	19	16	15	16	16	16
Orange Grove	38 ^a	31	30	28	31	34
Broadway/Swan	29	35	36 ^a	25	26	28

^a Invalid annual average due to insufficient number of samples
Annual standard - 50 μg/m³

Table 11
PM₁₀ Concentrations in Various Cities
Annual Average (µg/m³)

SITE	1990	1991	1992	1993	1994	1995
Ajo	44 ^a	31 ^{ac}	23	23 ^a	19 ^a	24
Bullhead City	39	34	30	31	34	36
Apache Junction	23 ^a	30	22	21	22	26
Casa Grande	32	29 ^a	30	31	27	29
Clarkdale	28 ^a	18	16 ^{abc}	16	17	17
Douglas	38 ^a	39 ^c	40	29	34	32
Flagstaff	29 ^a	22	24 ^{bc}	22 ^a	19	21
Hayden	35	36	35	27	26	34
Joseph City	21	21	17	16	15	16 ^a
Montezuma Castle	-	12	16	12	11	13
Naco	-	-	64 ^{ab}	48	39 ^a	45
Nelson	-	-	-	20	19	18
Nogales	52	50 ^c	54	42	39	43
Organ Pipe	23	11 ^c	11	10	9	9
Paul Spur	79 ^a	67 ^c	62	40	34	33
Payson	67	48 ^{abc}	40	32	30	39
Prescott	-	17 ^{ac}	19	17	15	14
Rillito	40	27 ^c	33	28	28	35
Safford	28	24	32	26	26	33
Show Low	22	18 ^a	21	17 ^a	14 ^a	16 ^a
Yuma	57	48 ^c	29	31	32 ^a	35

^a Invalid annual average due to insufficient number of samples

^b Site Relocated Mid Year

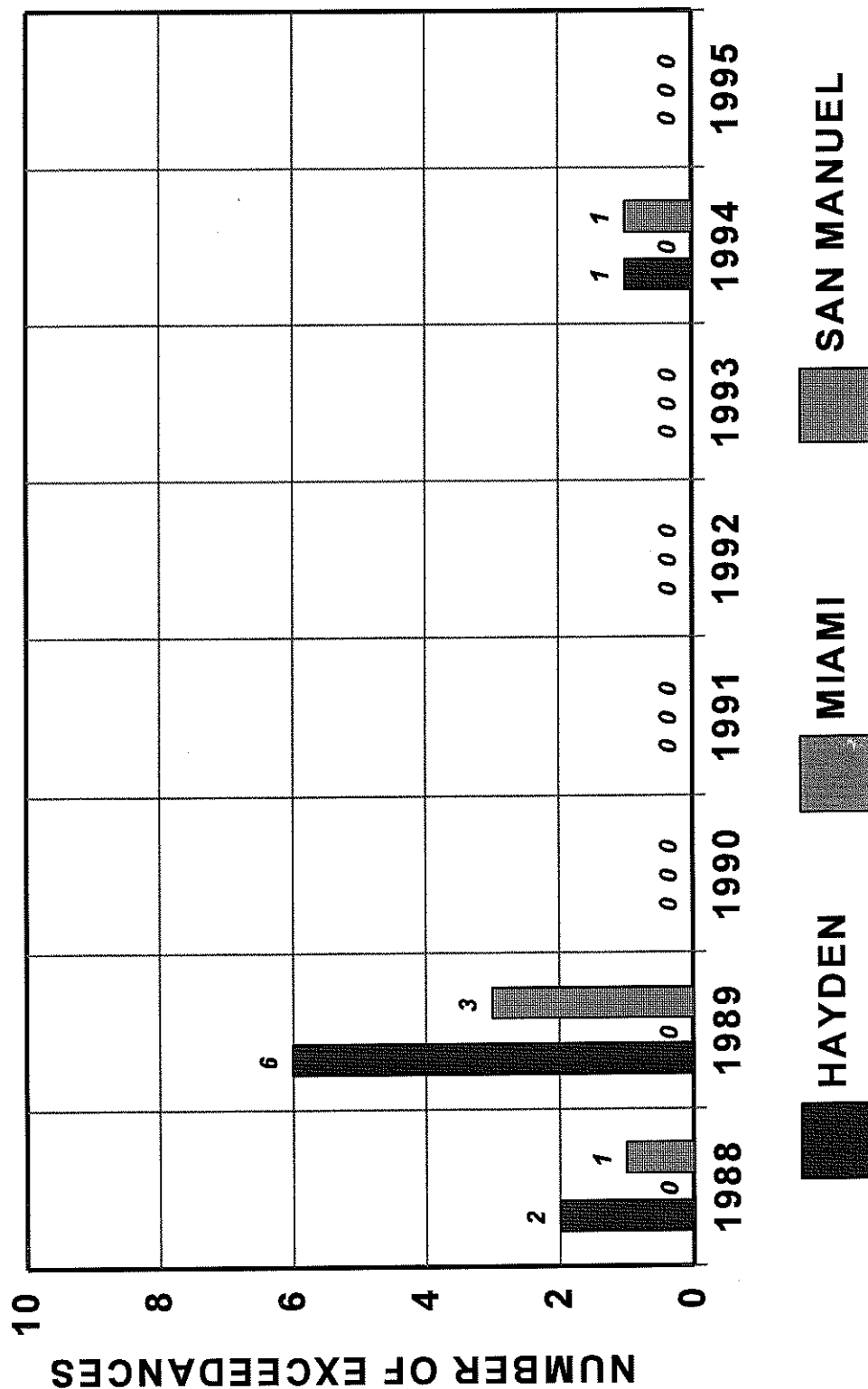
^c Sampler type changed

Annual standard - 50 µg/m³

FIGURE 9

SULFUR DIOXIDE 3 - HR EXCEEDANCES IN SMELTER TOWNS

Air Quality Standard is
1300 ug/m3 (3hr)



GENERAL MAILING LIST

j:\adq\assess\monitor\mlglisst.dat

MERGE WITH:

j:\adq\assess\monitor\mlglst.frm

Complete List j:\....\monitor\anlrptls.wpd (3/28/97)

1995

NOTE: Because this is a copy of the label list, when you copy this list on plain paper, YOU NEED TO FEED THE PAPER IN FEED TRAY, JUST AS THOUGH YOU WERE RUNNING LABEL SHEETS.

Mark Laufer
Yuma Daily Sun
P.O. Box 271
Yuma AZ 85364

Forest Air Resource Coordinator
Coconino National Forest
2323 East Greenlaw Lane
Flagstaff AZ 86004

Rebecca Burke
Government Document
Hayden Library
Arizona State University
Tempe AZ 85787-0706

Jo Riester
Government Reference Library
P.O. Box 27210
Tucson AZ 85726

Peter Corbett
Scottsdale Progress News
P.O. Box 1150
Scottsdale AZ 85252

Lindy Bauer
Maricopa Assoc of Governments
1820 W Washington
INTERAGENCY MAIL

Steve Moore
SEC - Donohue
P.O. Box 2400
Greenville SC 29616

Cecilia Y Parsels
Yuma Library
350 Third Ave
Yuma AZ 85364

Jane Mallon
Tucson Public Library
P.O. Box 27470
Tucson AZ 85726

Young Chang - EID-900
Angonne National Lab
9700 South Cass Ave
Oxgon IL 60439

Micheal D Lebowitz
Health Sciences Center
University of Arizona
Tucson AZ 85721

Bob Estes
Dames & Moore
7500 N Dreamy Draw Dr - Ste 145
Phoenix AZ 85020

Cari Anderson
Maricopa Assoc of Governments
2901 W Durango St
Phoenix AZ 85009

Attn: Nancy
Riordan State Park
1300 Riordan Ranch St
Flagstaff AZ 86001

Linda Risseuw
Mesa Public Library
64 East First Street
Mesa AZ 85201

Phoenix Public Library
Arizona Room
1221 N Central
Phoenix AZ 85004

Hank Eyrich - Air Quality
Pima Association of Governments
177 North Church Ave
Tucson AZ 85726

Amy Day, Economic Statistion
Elliot D Pollack & Company
7505 E 6th Ave - Ste 100
Scottsdale AZ 85251

Gaye Knight
City of Phoenix Environmental Program
251 W Washington St - 7th Fl
Phoenix AZ 85003

Deborah L Potter
USDA Forestry Service
517 Gold Avenue - SW
Albuquerque MN 87102

Air Quality Division
CIRA - Foothills Campus
Colorado State University
Fort Collins CO 80523

Norm Petersen
AZ Dept of Health Services
3815 N Black Canyon Hwy
INTERAGENCY MAIL

Dick Kamp
Border Ecology Project
Drawer CP
Bisbee AZ 85603

John Kennedy
Air & Toxics Division (A-2-4)
U.S. EPA, Region IX
75 Hawthorne Street
San Francisco CA 94105

Kristi Gebhart
National Park Service-CIRA-Foothills Campus
Air Quality Division
Colorado State University
Fort Collins CO 80523

Leonard Robbins - BIA
Environmental Quality Section
Navajo Area Office
P.O. Box 1060
Gallup NM 87301

Liz Szews
Environmental Planning Section
AZ Dept of Transportation
205 South 17th Ave
INTERAGENCY MAIL

Amy Coy
Lewis & Roca
40 N Central
Phoenix AZ 85003-1899

Mesa Public Library
Acquisition Services
64 East First Street
Mesa AZ 85201-6768

Miguel Flores, Chief
Monitoring & Data Analysis
National Park Service
P.O. Box 25287
Denver CO 80225

Serial Department
University Library
University of Arizona
Tucson AZ 85721

Jackie Wallace
Scottsdale Public Library
3829 Civic Plaza
Scottsdale AZ 85251

Coe Owen
Air & Toxics Division (A-2-4)
U.S. EPA, Region IX
75 Hawthorne Street
San Francisco CA 94105

Dan Shein
House of Representatives Staff
1700 W Washington
INTERAGENCY MAIL

Cosimo DeMasi, Senior Chem Engineer
Tucson Electric Power Co
P.O. Box 771
Tucson AZ 85702-0771

Dennis Haase
VSI Woodyard - Clyde Consultants
729 West Lynwood
Phoenix AZ 85007

Sandra Brazel
Department of Geography
Laboratory of Climatology
Arizona State University
Tempe AZ 85287

Darrell J Parson
San Manuel Division
BHP Copper Company
P.O. Box M
San Manuel AZ 85631

Tony Gomez, Jr
Cyprus Sierrita
P.O. Box 527
Green Valley AZ 85622-0527

Barbara Foster
Energy, Science & Nat'l Resources
Nat'l Conf of State Legislatures
444 N Capitol St- NW-STE 500
Washington D.C. 20001

Bill Pheiffer
Arizona Lung Association
102 East McDowell Rd
Phoenix AZ 85003

Attn: Lynn
Town of Payson
303 North Beeline Hwy
Payson AZ 85541

Rudolph Boksleitner
MC 76
U.S. EPA
Research Triangle Park NC 27711

Diane Malone
Navajo Air Quality Control
Program EPA
P.O. Box 308
Window Rock AZ 86515

Commander, U.S.A.G
ASQH-PCA-CRL/M. Stageberg
Library Bldg 80112
Ft. Huachuca AZ 85613-6000

Jim Blankenship
8145 East Knollwood Terrace
Tucson AZ 85715-2429

Rudolph Boksleitner
U.S. EPA
MC 76
Research Triangle Park
NC27711

Nancy K. James
The Arizona Daily
P.O. Box 26807
Tucson AZ 85726-6807

David S Baron, Asst Dir
In the Public Interest
Arizona Center for Law
1840 East River Rd-Ste 207
Tucson AZ 85718-5892

Tom Hormel
Woodward - Clyde Consultants
4582 South Ulster St - Pkwy
Denver CO 80237

Richard C Martin
USDA Forest Service
2324 East McDowell Rd-P.O. Box 5384
Phoenix AZ 85010

Ed Barry, Western Envrnmntl Mgr
Chemical Lime
8777 N Gainey Center Dr - Ste 280
Scottsdale AZ 85258

William Coulombe
Desert Research Institute
P.O. Box 60220
Reno NV 89506

Donald W Moon, Consultant
Air Quality & Meteorological
515 South Park Crest
Mesa AZ 85206

Ken Evans
EMCON
3922 E University Dr - Ste 7
Phoenix AZ 85034-7223

*

*

COUNTIES MAIL LISTING

Don Foster, Director
Apache County Health Dept
P.O. Box 697
St Johns AZ 85936

Betty King, Director
Cochise County Health Dept
1415 W Melody Lane
Bisbee AZ 85603

Elsie Eyer, Director
Coconino County Dept Health Svcs
100 East Birch
Flagstaff AZ 86001

A Martin Hetrick, Dr
Gila County Dept of Health
1100 Monroe Street
Globe AZ 85501

Neil Karnes, Director
Graham County Health Services
826 Main Street
Safford AZ 85546

Patrick Peters, Director
Greenlee County Dept of Health Svcs
P.O. Box 936
Clifton AZ 85533

Marion Shontz, Director
La Paz County Health Svcs
1112 Joshua Street
Parker AZ 85344

Jerry Street, Director
Mohave County Health & Social Svcs
P.O. Box 7000
Kingman AZ 85039

Maxine McKee, Director
Navajo County Dept Health Svcs
P.O. Box 668
Holbrook AZ 86025

Ben Stepleton, Director
Santa Cruz Health Department
Congress Drive
Nogales AZ 85621

Marcia Moran Jacobson, Director
Yavapai County Health Dept
930 Division Street
Prescott AZ 86301

David Brooks, Director
Yuma County Health Department
201 South Second Ave
Yuma AZ 85364

*

*

*

*

*

*

*

ADEQ LIST

Nancy Wrona, Director
Air Quality Division
ADEQ - INTEROFFICE
T-5017

Dan Grubbe, Section Manager
Vehicle Emissions
ADEQ - INTEROFFICE
VEP

Gary Neuroth, Section Manager
Air Assessment
ADEQ - INTEROFFICE
AT-5024

Ira Domskey, Section Manager
Planning
ADEQ - INTEROFFICE
LT-5019

Prabhat Bhargava, Section Manager
Permits
ADEQ - INTEROFFICE
PT-5043

Mike Traubert, Section Manager
Compliance
ADEQ - INTEROFFICE
CT-5001

John Burchard, Unit Manager
AAS/Special Projects
ADEQ - INTEROFFICE
AT-5033

Randy Sedlacek, Unit Manager
AAS/Evaluation
ADEQ - INTEROFFICE
AT-5034

Pete Lahm
US Forest Service
ADEQ - INTEROFFICE
AT-5071

Jim Guyton - All Monitoring Unit Staff
Monitoring Unit
ADEQ

Kelly Cairo
Office of Customer Service &
External Affairs - (12 Copies)
ADEQ - INTEROFFICE

SAMPLER OPERATOR LIST

Charles Conner
Rt 1, Box 1831
Why AZ 85321

Sonny Jackson
P.O. Box 248
Clarkdale AZ 86324

John Cryar
724 Cordova Street
Douglas AZ 85607

Bob Gray
Wildcat Hill Plant
2800 North El Paso Rd Flagstaff AZ 86004

Jack Catt
Mohave Generating Station
2700 Edison Way Laughlin NV 89029

Ray Morales
P.O. Box 753
Kearny AZ 85237

Robert White
HC01 Box 3053
Bagdad AZ 86321

Di Rushford
Montezuma Castle Nat'l Monument
P.O. Box 219 Camp Verde AZ 86322

Marvin Wooten
124 Whelan Ave
Bisbee AZ 85603

Gerald Findler
Chemstar Lime Plant
P.O. Box 370 Peach Springs AZ 86434

Sam Stapleton
Santa Cruz County Health Dept
P.O. Box 1150 Nogales AZ 85628

Gerardo Monroy-Herrera
SRO
400 West Congress Tucson AZ 85701

Ami Pate
Organ Pipe NM
Hwy 85, Rt 1, Box 100 Ajo AZ 85321

Alice Turner
1309 N Matterhorn Road
Payson AZ 85541

Vince Gianfrancesco
1512 Golden Dr
Chino Valley AZ 86323

Carl Gremmler
P.O. Box 755
Rillito AZ 85654

Jim Moser, Engineer
County Planning & Zoning
800 Main Street Safford AZ 85546

Memi Heeder
511 Verde Height Dr
Cottonwood AZ 86326

Ahmed N'ait Ali
1526 9th Avenue
Yuma AZ 85364

NETWORK OPERATORS LIST

Neil A Gambell, Tech Svc Mgr
Ray Complex
ASARCO Inc

Wayne H Leipold
Senior Environmental Engineer
Cyprus Miami Mining Co
P.O. Box 4444
Claypool AZ 85532

Vi Brown
Envrnmntl Svcs Dept-Tech Svcs Div
Maricopa County
2406 S 24th St - E111
Phoenix AZ 85034-6822

Don Gabrielson, Director
Pinal County Air Quality Control Dist
P.O. Box 987
Florence AZ 85232

Stan Marsh
Mohave Ambient Air Quality Program
South California Edison Co
P.O. Box 800
Rosemead CA 91770

Floyd Fusselman, Environmental Engineer
Phoenix Cement
P.O. Box 428
Clarkdale AZ 86324

Richard M Hayslip
Environmental Services Dept
Salt River Project
P.O. Box 52025
Phoenix AZ 85072-2025

Thomas Brosnan
Arizona Portland Cement
P.O. Box 338
Rillito AZ 85654

David R Simonton
Arizona Public Service Co
Cholla Power Plant P.O. Box 188 Joseph City AZ

P.O. Box 8
Hayden AZ 85235

Jerry C. May, Division Mgr
San Manuel Division
BHP Copper Inc
P.O. Box M
San Manuel AZ 85631

David Esposito, Director
Pima County Dept of Environmental Quality
130 West Congress Street
Tucson AZ 85601-1317

Prabhu Dayal
Environmental Superintendent,SGS
Tucson electric Power Co.
P.O. Box 711
Tucson AZ 85702

Jim Sisler - Air Quality
National Park Service
CIIRA - Foothills Campus
Colorado State University
Fort Collins CO 80523

Tomas A Miller
Applied Environmental Consultants, Inc
2465 W 12th Street - Ste 6
Tempe AZ 85281

Thomas C Ahlers
Safety & Environmental Services
Praxair, Inc
I-40 & Griffith Road
Kingman AZ 86401

Ash Lavendar, Jr
Tribal Forestry Dept
P.O. Box 700
Whiteriver AZ 85941

*

*